The Xtal Set Society Newsletter

Volumn 27, No.5 September 2017

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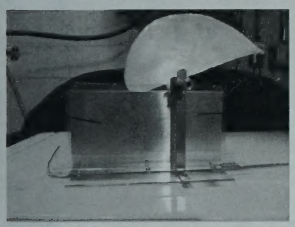
I'd Never
By Ken Ladd

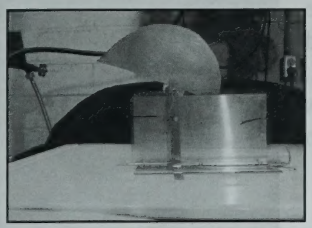
Wound a coil with a removable form.

Used a slider to tune a coil.

Built a rotary variable capacitor.

After having built the Scrap Pile Radio with the sliding variable capacitor from John Rowland's Cache Lake Country book for last year's Radio Daze contest I began to wonder if I could build a rotary unit. I went to see my friend Del and we made a tracing of a vintage offset unit that he has. I had some enlargements made and selected one that I hoped would give me 500pf with one rotor and two stator plates. Home Depot had some 4x8 right angle aluminum flashing that was the perfect size. I used plastic from deli packaging for the insulators and a plastic cover from a mixed nut container for the tuning knob.





I have a collection of crystal radio plans that I began while in high school some fifty years ago. I selected Will H. Bates a Selective Crystal Receiver from the January 1925 issue of Popular Mechanics. I wound the main coil using a nineteen nail form as per the article. I wound the antenna coil using a plastic form that I bought from Mike Peebles after deepening the slots with the edge of a file.

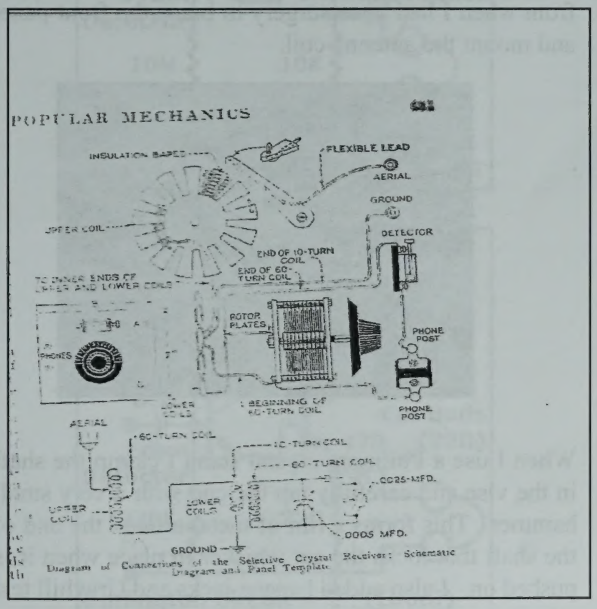
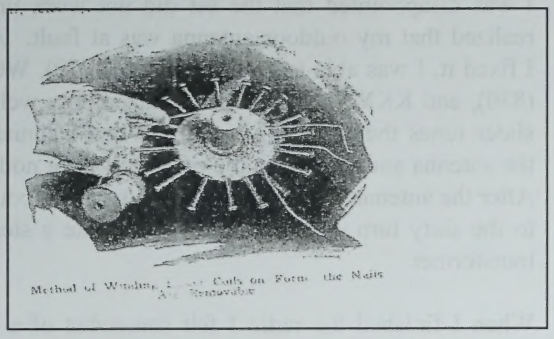


Diagram of Connections of the Selective Crystal Receiver: Schematic Diagram and Panel Template

From 1925 Popular Mechanics



Method of Winding [illegible] Coils on Form the Nails Are Removable

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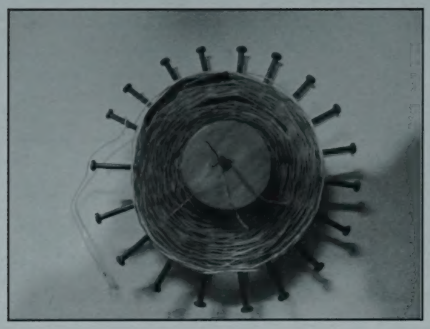
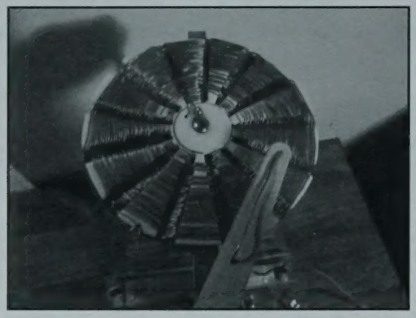


Ken's removable coil

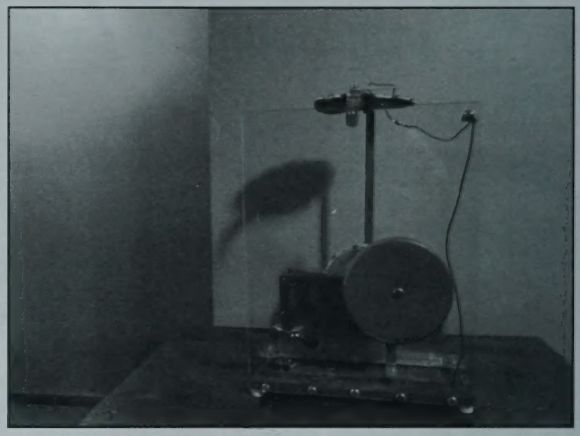
I used a scrap of plywood and Plexiglas that I found in the garage for the base and front panel. I used an aluminum strip that I had salvaged from a leg immobilizer from when I had knee surgery to brace the front panel and mount the antenna coil.



When I use a Philmore crystal stand I clamp the shaft in the vise and carefully tap the end with a very small hammer. This forms a rim of metal around the end of the shaft that locks the cat whisker in place when it is pushed on. I also added banana jacks and Grayhill test clips for using a diode.

I was disappointed that the set did not work until I realized that my outdoor antenna was at fault. After I fixed it, I was able to receive KUOM (770), WCCO (830), and KKMS (980). I am amazed how well the slider tunes the incoming signal. When I connected the antenna and ground to the main coil I got nothing. After the antenna coil is tuned the ten turn coil couples to the sixty turn coil and perhaps acts like a step up transformer.

When I finished the radio I felt somewhat of a connection with Mr. Bates. There have been others like John Rowland (Scrap Pile Radio) and of course Elmer Oasterhoudt who started it all for me. When working with such old plans questions cannot be asked or comments made. Even so it is rewarding to do these projects. However no matter what I did I could not receive additional stations. I substituted a factory made VC and saw no improvement. I removed it and placed it in series with the antenna. I was then able to receive stations across the MW band and peak them. I rewired the set with the homemade capacitor in series with the antenna coil. It only took 92 years to find the error in the printed diagram!! Like Bates said it separates stations quite well.



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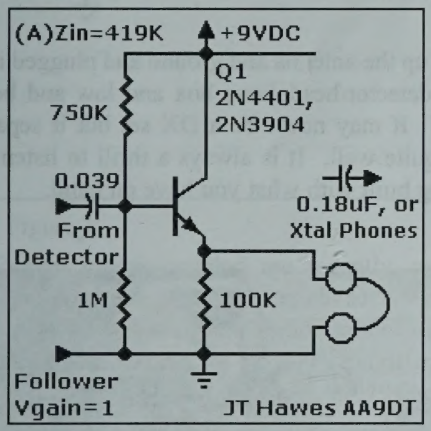
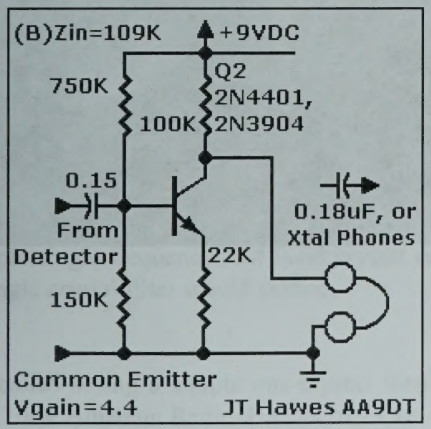
Bipolar Transistors in Crystal Radio Circuits
by James Hawes

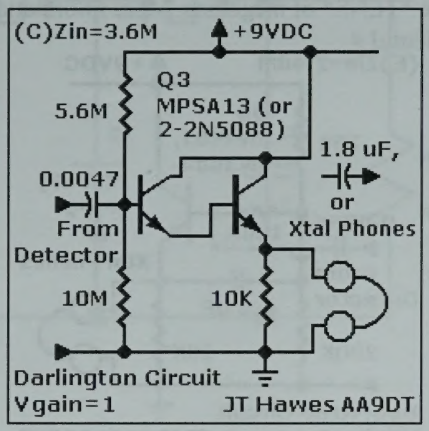
Many hobbyists think that bipolar transistors (BJTs) are low-impedance (insensitive) devices. If so, then transistors must be inappropriate for crystal radio circuits. Fortunately, both of these ideas are false. My tested schematics show three ways that one can use a BJT in a high-impedance ("hi-Z") circuit.

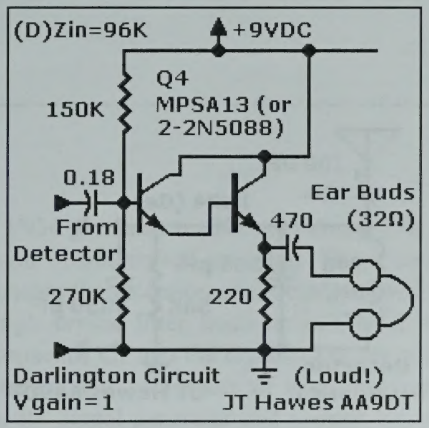
(A & B) Regular transistor amplifier circuit, but with "tube-like" resistor values. Such circuits have high input and output impedances. Emitter follower (A) develops a 419K input Z. Common-emitter stage (B) offers a 109K input Z, plus gain.

(C) & (D) Darlington circuits. The input Z of follower (C) is high, but the output Z is low. Amp (C) can drive ceramic phones, but *NOT* ear buds. Amp (D) allows use of 32-ohm ear buds. Ear buds require a coupling capacitor.









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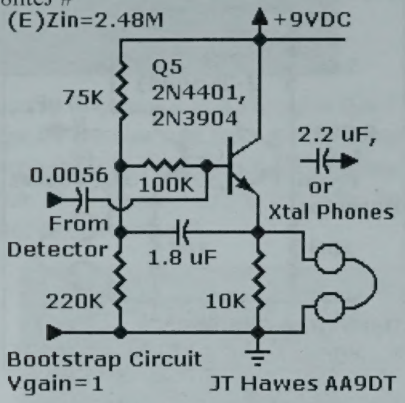
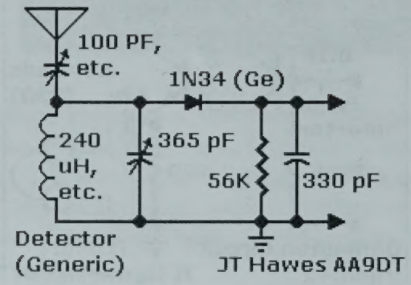
(E) Bootstrap circuit: Positive feedback in the base raises the input impedance into the megohms. Normal output impedance, suitable for a crystal headphone. A Darlington bootstrap is also possible. The impedance could be *TENS* of megohms. More information: goo.gl/J8nteJ #



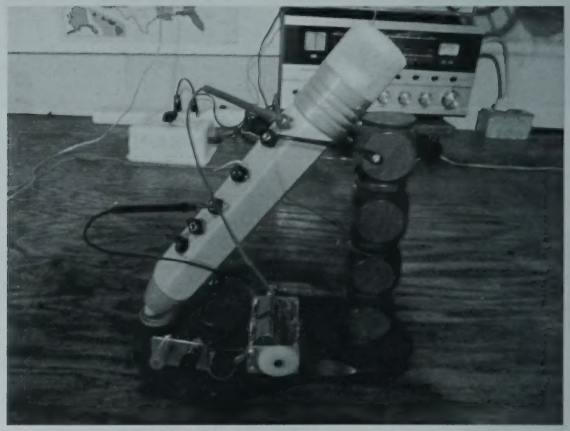


Chalk It Done!
by Ken Ladd

Some of you may recall that I began to build a radio using a chalk pencil that my daughter had. I removed the chalk from the storage chamber and replaced it with a cylindrical tooth brush holder that I had wound with #24 cotton covered wire. I brought taps out to pin jack. The stand was made out of plant stand scraps and coat hanger wire.

I played with it but did not finish it until today. I added a salvaged two gang variable capacitor. The nylon gear on the shaft serves as a tuning knob. One section is in the ground circuit and the other in the tank circuit. Probes from a shirt pocket DVM that died are used in the taps.

I hooked up the antenna and ground and plugged in my external detector/headphone box and low and behold it works! It may never be a DX set but it separates stations quite well. It is always a thrill to listen with something built with what you have on hand.



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A Crystal Filter Crystal Set?
by Phil Anderson, WØXI

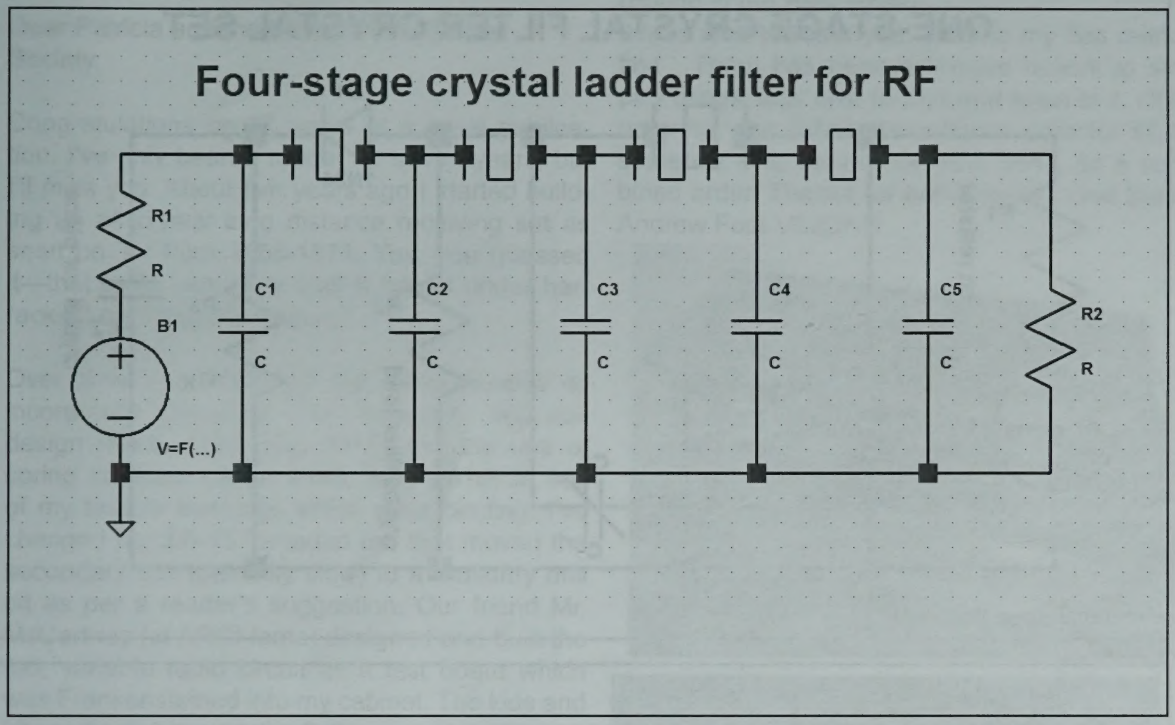

Figure 1

A foreign reader emailed me recently, asking if it would be possible to build a crystal set for listening to a specific 50 kilowatt AM radio station just below 1 Megahertz. It occurred to me that a single quartz crystal filter like those introduced in the 1950s for shortwave receivers of the day might be used instead of the typical coil and air variable capacitor to tune such a set.

Modern crystal filters for commercial and home-brew shortwave receivers typically use from 4 to 8 crystals to fashion the desired overall bandwidth of signals heard. As such the noise levels are reduced and weaker signals can thereby be heard. A typical schematic for these modern day filters is shown in Figure 1. For a simple single frequency AM band crystal set, perhaps a single crystal filter would suffice.

I recalled seeing a simple one-crystal filter circuit in the 2004 Amateur Radio Handbook. I've redrawn a version of that (see Figure 2) adding a load resistor (R2), 1N34 germanium (detector) diode, 47K resistive load and quartz crystal ear plug. These components may enable the reception of the AM signal filtered by the single crystal filter, made up of L1, L2, compression capacitor C1 and the crystal. The set will require an antenna and some sort of coupling, represented by the RF signal generator and resistor R1, shown in Figure 2.

I'm guessing about 40 feet of antenna wire, a ground to a grounding rod and a toroidal transformer would be sufficient to introduce the AM signal to the set (see Figure 3). One would use a few turns on the antenna side and wind perhaps twenty or more turns on the secondary to feed the AM signal to the set (at the top of coil L1) (See Figure 2). If I had a few crystals in the range of 550 kHz to 1.4 MHz, I'd try wiring up a set. At the moment I don't have any on hand. If you have a crystal matching a local AM station's frequency, give this set a try and let me know how you do?

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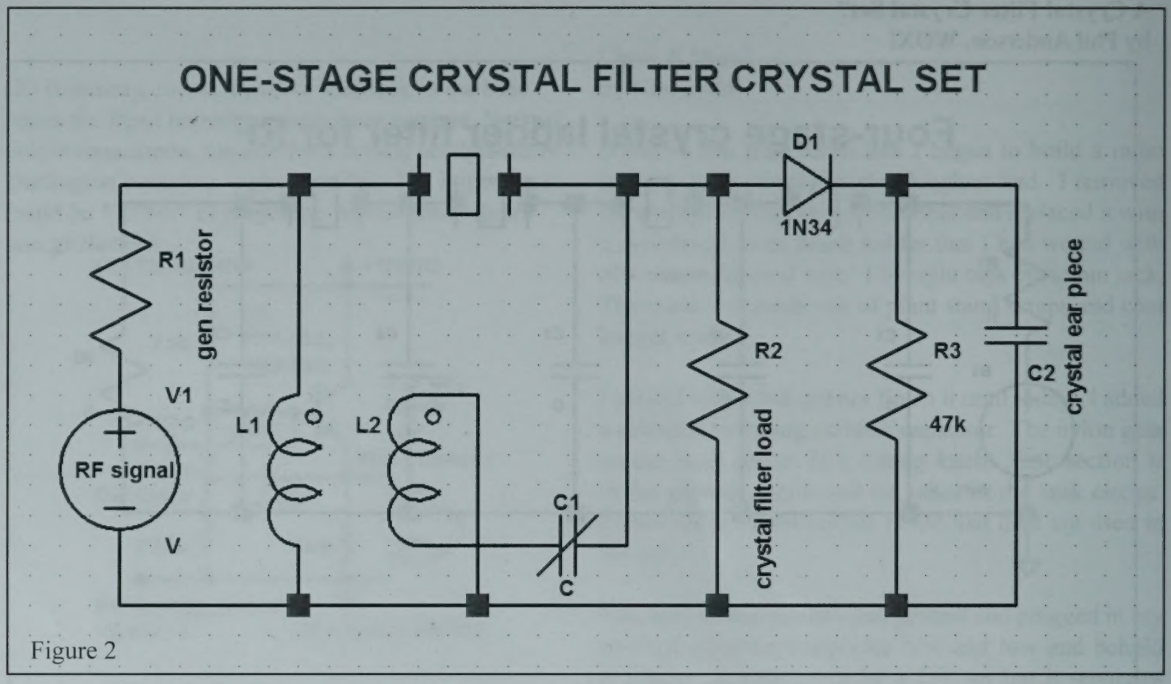

Figure 2

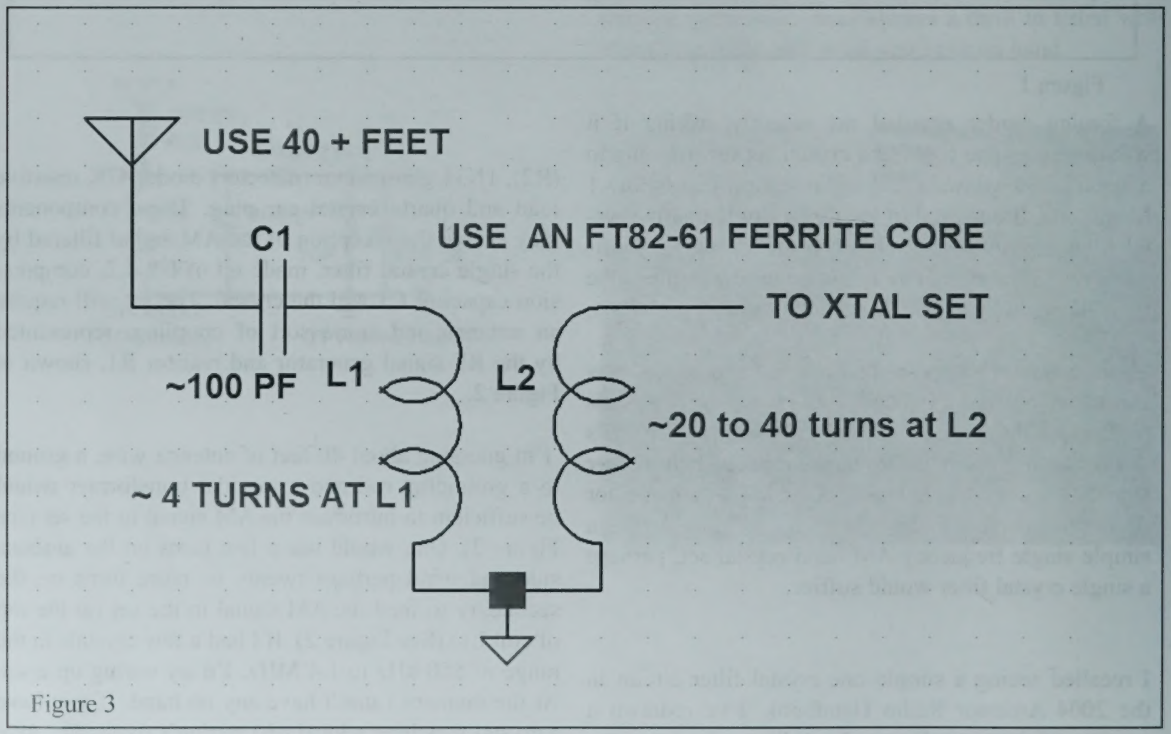

Figure 3

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Xtal Corner: Reader Correspondence

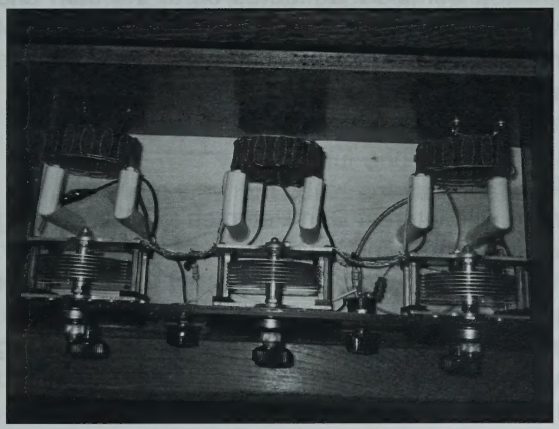
Dear Patricia and the Folks at the Xtal Set Society,

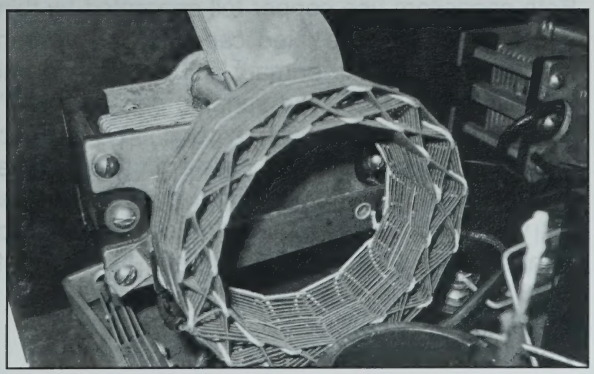
Congratulations on 27 years of a great publication. I've only been a reader for seven years, but I'll miss you. About five years ago I started building an all crystal long distance receiving set as seen on TV from 1965-1971. Yes, you guessed it—that radio seen in a well-lit tunnel under barracks 2 on "Hogan's Heroes."

Over time I've reworked the loose coupler to incorporate ideas by Dan Peterson, like coil design (issue #144, July 2015) and the use of spring contacts (issue #149, May 2016) in lieu of my bronze bushings which were binding. I've changed my 3/8-16 threaded rod that moved the secondary coil (painfully slow) to a masonry drill bit as per a reader's suggestion. Our friend Mr. McCartney (of ARCI fame) designed and built the four variable radio circuit as a test board which was Frankensteined into my cabinet. The kids and I hope it will be ready by Fall.

Thanks again for all the great years. PS: The photo shows the kids dressed up and posing with my Hogan's Heroes radio. Just a bit of fun. Mark Rose and Family

(Found in our April email)
It was nice to meet you. Here is my flea market find . There has been extensive rework to simplify things. Just love to look and listen to it. I'll be ordering your Infinite Impedance detector kit by someone else Steve Fell VE2 SWC, as a combined order. Thanks for being there . God Bless, Andrew Foot VE2DNN





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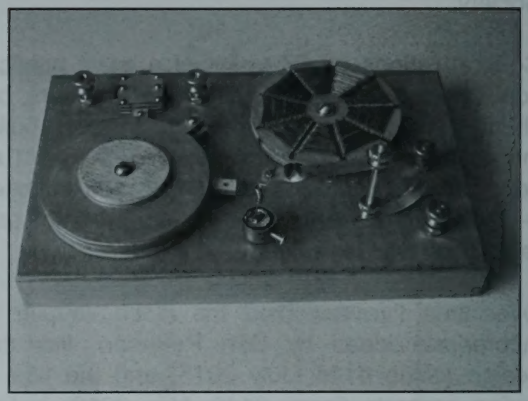
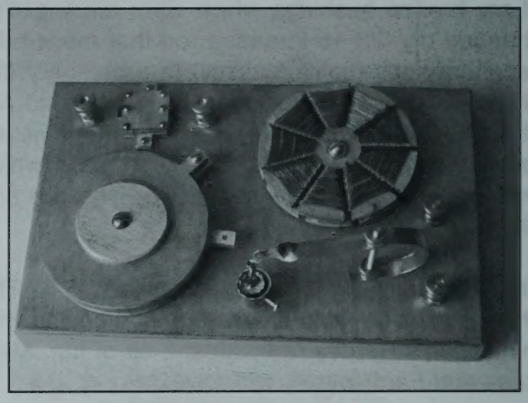
Phil
Here goes.
I had a large barn built for a shop. Part of the project was an air distribution system for the air-compressor. Unfortunately my builder was not on his game and the system had leaks. Most of the system was behind the walls. I had purchased my air-compressor in the 60s, so I wanted to take care of it. I did not want to spend my time with a spray bottle checking each fitting to see if I could find the leak/s or tearing walls down. I have a history of hours and thousands of dollars with buses chasing air leaks.

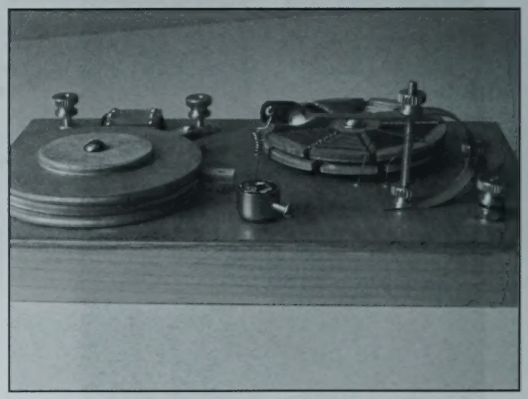


A ham friend of mine suggested I purchase and build Phil's ultrasound receiver and parabolic dish kit. I did and it had been many years since I had assembled a through hole kit. Needless to say, it was fun. I ever got out some of my test equipment.



New toy working I wandered off to the barn and within a minute had located the offender. I cannot image a diesel mechanic not having one of these receivers. What a great tool. Thank Phil.
Peter Naumburg

Hi,
I read with interest Dan Petersen's "Disappearing Variable Capacitor" article in the May newsletter. I thought Dan would be interested in my attempt to construct both fixed and variable capacitors. I made this set last year and wanted everything to be formed from scratch. 1/8" birch plywood and pine are the main construction materials. Both capacitors use copper foil separated by thin sheets of Mylar. The fixed capacitor is between the antenna and the primary coil and is rated at approximately .1 nF. The variable capacitor is 3" in diameter and comes in around 300 pF. Two loosely coupled spider web coils are used and the detector is galena. I originally tried a razor blade but the volume was too low. It picks up our two local stations. One is at 94 kHz and the other at 1420 kHz. I'm using a 100' antenna.
Sincerely, Terry Lutz



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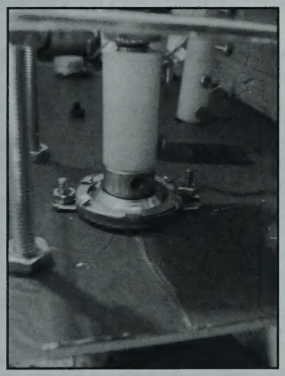
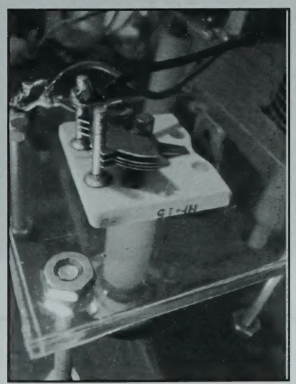
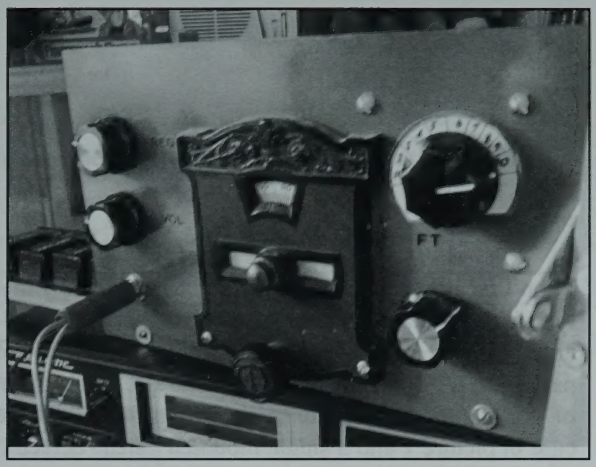
From Paul Pedrazza: Check this out: Fine tuning. I added a 6:1 drive and Led behind inner dial and a lid from a Large Pill bottle. and spared parts to complete this fine tuner for the 2 3S4 SSB/CW Receiver. I might change out the panel sometime this Year and expand all 4 co







A Tribute and a BIG THANKYOU!

I probably learned of The Xtal Set Society in The Horn Speaker or Radio days. Either way I jumped at the choice to become a member.

Sometime later I had the pleasure of meeting Rebecca at Radio Daze in Bloomington Minnesota.

The newsletter has provided a wealth of plans and informative articles and member stories.
RAP N TAP was very helpful and also linked up members in a way that could not have happened any other way.

Thank you to Phil, Patricia, and Rebecca for all your work over the years. I have one concern about you moving into the retirement community. Do they allow radio antennas? I try to live by a fortune cookie that I once found. Retirement is not the end of life.

Ken,
Thank you for your kind words. We will be taking the society with us when we move so you can still get books, parts, kits from our website. The townhouse we would go to is now occupied so we are on a waiting list to get in. A fellow ham lives there now and has a nice antenna, so ours will be moved with us. Patricia

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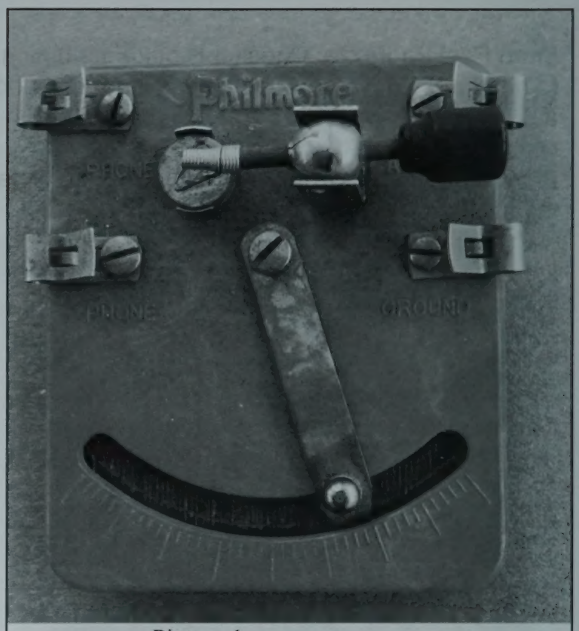
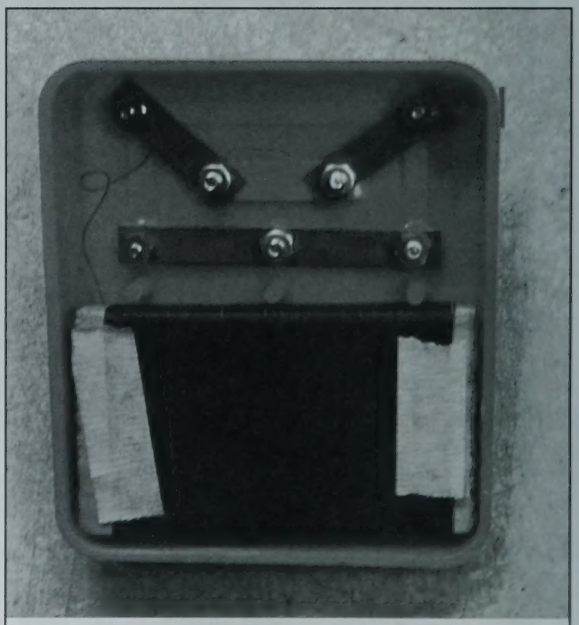
A LOOK BACK to the 50s....THE PHILMORE CRYSTAL SET
Phil, WØXI

I don't recall the exact years.....but it is likely that the plastic cased Philmore AM crystal set was available in the late 1950s and 60s. It came in a variety of packages: a full set, as noted in picture 1, a partial set of just the mechanical items shown on the top of the case in picture 1 and a single mounted galena detector. Amateurs tuned the set by adjusting the lever attached to the "smile" slot at the bottom and setting the galena detector with ball and cat whisker fixture centered at the top.



Picture 1

A single coil made up the AM tuned circuit as noted in picture 2 – the underbelly of the set. Note that the coil was wound on a small piece of wood using #26 or #28 enamel coated wire. Strips of copper were used to interconnect the circuit of parts. Note that the strips have oxidized with time.
Given the small size of the tuning coil and the use of the galena detector, one had to "tinker" with each to tune in and receive a signal. This set and others were marginal but worked reasonably well if the operator lived in a big city that featured high-power AM stations. I live in a small town that has a typical 500 watt AM station wherein the antenna is within 7 miles of my house. The signal is adequate for listening.


Picture 2

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P.O Box 3636 Lawrence KS 66046 xtalqm@gmail.com

Description		Cat#	Qty	Price

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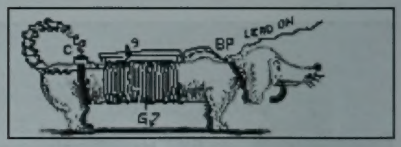
Phone: 405-517-7347

9-1-17



We are dedicated to once again building and experimenting with radio electronics, often—but not always—through the use of the crystal set, the basis for most modern day radio apparatus. This newsletter helps support our goal of producing excellent quality technical books that encourage learning and building.

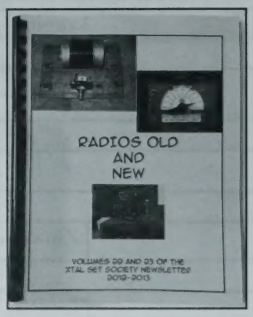
Please send correspondence to the following address:

PO Box 3636, Lawrence KS 66046

SPIDER WEBS, CIGAR BOXES, PARTS AND MORE

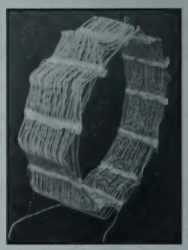
Volumes 24 and 25, of the Xtal Set Newsletter are packed with projects. 2014 was the year of the spider Web crystal set and 2015 was the year of the cigar box radio contest This book has the winning designs for cigar box radios as well as Dan's 2-Tube Shortwave "Jenny". A special tribute to Bob Ryan, long time crystal set designer and builder and lots more. vol25 $14.95

RADIOS OLD AND NEW is volumes 22 and 23 of the Xtal Set Society Newsletter. A wide range of topics and projects are covered in 2012: aerials circa 1917, experiments with regens, grounding and reducing noise in your station, experimenting with spider coils, a 2 for 1 regen set, primer for the 602 mixer at 40 kHz, a modern TRF AM receiver. The following topics for 2013 are: JFET Drain-Output set, a foxhole radio, feedback for beginners, a modern day regen, the universal crystal set, The Albert Hull Memorial Dynatron Regenerative Receiver, adding absorption wave traps, from telegrapher to coherer, a 700 Hz oscillator featuring a quadrature architecture, and more. Vol 23 $15.95



WIRE

24 Gauge insulated hook-up	$5.50
150/46d Litz 100 ft	$23.95
26 gauge magnet	$6.95
22 gauge magnet	$6.95



Crystal Set Projects You Can Build is a collection of 14 radio projects designed by members of the Xtal Set Society. The members hope that by creating this book they will help others to discover this great hobby while at the same time learning basic radio concepts. Here's a sampling: Low Budget Xtal Set, A Loop Antenna Crystal Set, The Den Two Crystal Set, Build a Matchbox Crystal Radio, The triple Tuned Crystal Set and more. XCP $12.95

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